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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/083,094

02/26/2002

Martin Smith

476-2094

5423

23644

7590

09/18/2006

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EXAMINER

AGHDAM, FRESHTEH N

ART UNIT

PAPER NUMBER

2611

DATE MAILED: 09/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/083,094	SMITH ET AL.	
	Examiner	Art Unit	
	Freshteh N. Aghdam	2611	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 July 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed 7/10/2006 have been fully considered but they are not persuasive.

**Applicant's Argument(s):** On page 5, regarding claims 1 and 11 applicant argues that the claimed subject matter is not taught or suggested by Gore "Gore lacks any teaching of directional antennas or beams and certainly does not teach an adaptive combiner."

**Examiner's Response:** Gore teaches directional antennas or beams (Par. 4 and 8) and an adaptive combiner to combine the antenna elements such that two or more diverse directional antenna beams are provided to receive two or more inputs, wherein said combiner being arranged to couple said inputs to two or more receive chains (Fig. 1, means 320-323; Fig. 2, means 402-403; Par. 4, 8, 11, 23, and 26).

### ***Claim Rejections - 35 USC § 102***

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4-5, 9, and 11-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Gore et al (US 2002/0102950).

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As to claims 1 and 11, Gore teaches a multiple input multiple output (MIMO) radio communication device (Par. 18) comprising a plurality of antenna elements (Fig. 1, means 321; Par. 19-21); a combiner arranged to adaptively combine said antenna elements such that two or more diverse directional antenna beams (Fig. 1, means 304 and 324; Par. 4, 8, 11, and 26) are provided to receive two or more inputs, where each input is a MIMO channel; said combiner being arranged to couple said inputs to two or more receive chains (Fig. 1, means 320 and 322; w RF chains); and a processor (Fig. 1, means 323, 324) arranged to operate on outputs of multiple receive chains to produce an output signal; and wherein there are more antenna elements than receive chains (Par. 7).

As to claims 4 and 12, Gore further teaches said antenna beams are diverse as a result of space diversity (Fig. 1, means 304, 324; Par. 8 and 23).

As to claims 5 and 9, Gore further teaches that said combiner comprises at least one beam-former (Par. 8, 11, 16, 25-26).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gore,

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and further in view of Lindoff et al (US 6,700,882).

As to claim 3, Gore teaches all the subject matters claimed above, except for the radio communication device being a user terminal. Lindoff teaches that a mobile station with 2 or more antenna elements (antenna array system) that enables the mobile station to have a better coverage and data throughput per link (Fig. 8; Col. 8, Lines 24-49). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Lindoff with Wegner in order to enable mobile station to have a better coverage and data throughput per link.

Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gore, and further in view of Rudrapatna (US 6, 801,790).

As to claim 6, Gore teaches all the subject matter claimed above, except for some of the antenna elements being provided as a phased array. Rudrapatna teaches routing signals according to amplitude, phase, code, or time slot to allow the antenna array operate in one of the three modes or operate in any combination of the three modes (Col. 6, Lines 50-67; Col. 7, Lines 1 and 2). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Rudrapatna with Gore in order to improve some performance criterions such as data rate and error rate over a wireless link.

As to claim 7, Gore teaches all the subject matters claimed above, except for a pair of antenna beams with substantially orthogonal polarizations and at substantially similar directions. Rudrapatna teaches a pair of antenna beams with substantially orthogonal polarizations and at substantially similar directions (Fig. 1, Col. 5, Lines 8-

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37). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Rudrapatna with Gore in order for the antenna array to be able to transmit or receive signals, which are relatively highly correlated to allow for beam forming/ steering operations (Fig. 1 and 2; Col. 5, Lines 25-35).

As to claim 8, Gore teaches all the subject matters claimed above, except for a pair of antenna beams with substantially orthogonal polarizations and at substantially similar directions but being at a different direction from said pair of antenna elements. Rudrapatna teaches a pair of antenna beams with substantially orthogonal polarizations and at substantially similar directions but being at a different direction from said pair of antenna elements (Fig. 1 and 2; Col. 5, Lines 8-37). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Rudrapatna with Gore in order for the antenna array to be able to transmit or receive signals, which are relatively highly correlated to allow for beam forming/ steering operations (Fig. 1 and 2; Col. 5, Lines 25-35).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gore.

As to claim 10, Gore teaches all the subject matters as recited in claim 1, except for a communication network comprising a plurality of radio communications devices. One of ordinary skill in the art would clearly recognize that a communication network comprises of a plurality of radio communication systems (i.e. transmitters, receivers, transceivers, BSs, MSs, and so on). Therefore, it would have been obvious to one of ordinary skill in the art to apply the communication system of Gore in a communication network in order to perform data transmission more reliably.

Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rudrapatna, and further in view of Gore et al.

As to claim 13, Rudrapatna teaches a MIMO radio communications device comprising transmitting radio signals from a plurality of antenna elements by; processing signals on two or more transmit chains to produce two or more processed signals (Fig. 1, means 120, 122, 124, 126, and 128), wherein each processed signal is a MIMO channel; and using a combiner to adaptively combine the antenna elements such that they are operable in at least one direction to transmit the two or more processed signals as diverse outputs (Fig. 1; Col. 3, 25-34, 38-40, and 45-49).

Rudrapatna does not expressly teach that the number of transmit chains is greater than the number of antenna elements. Gore, in the same field of endeavor, teaches that the number of transmit chains is greater than the number of antenna elements (Par. 7). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Gore with Rudrapatna in order to improve the system performance by using less RF chains than antenna elements (Par. 7).

As to claim 14, Rudrapatna teaches a MIMO communication system wherein the transmitted and/or received signals are time space coded and the diverse antenna beams are MIMO (Col. 1, Lines 46-50; Col. 3, Lines 38-41).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Freshteh N. Aghdam whose telephone number is (571)

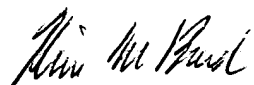
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272-6037. The examiner can normally be reached on Monday through Friday 9:00-5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Freshteh Aghdam  
September 11, 2006

  
**KEVIN BURD**  
**PRIMARY EXAMINER**